CAMBRIDGE OCR

Summary brochure

Engineering, Design and Technology qualifications

Engineering and design are fundamental to our modern economy and key to driving change and innovation. Our modern Engineering and Design and Technology qualifications reflect this and provide students with a solid foundation for understanding and applying this subject in their future working lives.

Version 1.0 | September 2025

ocr.org.uk/engineering | ocr.org.uk/designandtechnology

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Qualifications for a modern world

The UK is in the business of high added value, high technology, sustainable engineering and manufacturing and innovative design. We've designed our Engineering qualifications with the workplace in mind.

Cambridge Nationals in Engineering are for students aged 14 to 16 years old. In creating them, we listened to, and worked closely with employers such as JCB, Siemens and Rolls-Royce, and professional bodies like the Royal Academy of Engineering, as well as the University of Northampton and teachers from schools and university technical colleges (UTCs). Our aim is to make sure that the next generation of young engineers is equipped with the skills demanded by employers in the engineering community. Read more about Cambridge Nationals on page 5.

Cambridge Technicals in Engineering are for students aged 16+. A high-quality alternative to A Levels, they enable you to provide qualifications that are fit for purpose, right for your student's destination, and accessible for their needs. Read more about Cambridge Technicals on page 9.

Pathways for engineering

KS4

GCSE (9–1)
Design and Technology*

Cambridge Nationals
Engineering Design*

Cambridge Nationals
Engineering Manufacture*

Cambridge Nationals
Engineering Programmable Systems*

*Progress 8 and performance points

Guide students towards suitable pathway

KS5

AS Level
Design and Technology**

A Level
Design and Technology**

Cambridge Technicals
Engineering Level 2 and 3†

Cambridge Advanced Nationals
Engineering

**Performance points

†Performance points apply to certain qualifications

Stimulating and engaging KS5 options

Career and progression

University

Employment

Apprenticeship
Level 2 and 3 / Higher Apprenticeship

GCSE (9–1) Design and Technology

THE QUALIFICATION

Learning about design and technology encourages your students to develop design and thinking skills that open up a world of possibility, giving them the tools to create the future.

This specification is designed to excite and engage them with contemporary topics covering the breadth of this dynamic and evolving subject.

It aims to relate authentic real-world awareness of iterative design practices and strategies used by the creative, engineering and manufacturing industries. Students use critical thinking, leading towards invention and design innovation, to design and make prototypes that solve real and relevant problems, considering their own and others' needs, wants and values.

We've drawn on the research and authentic practices of an initiative called Designing Our Tomorrow (DOT), from the University of Cambridge. Experiencing learning through practical activity (both designing and technical principles) is fundamental to the delivery of this specification, as is the importance of the contextual relevance of design and technology practice.

ASSESSMENT

There are two submission options for the non-exam assessment. These options determine the entries, but do not signify different routes through the qualification. Students must take either:

- Components 01 and 02 for the Cambridge OCR Repository submission option

or

- Components 01 and 03 for the postal submission option

Principles of Design and Technology* (01) – written paper
50% of total GCSE (9–1)

Iterative Design Challenge* (02, 03) – non-exam assessment
50% of total GCSE (9–1)

*Indicates inclusion of synoptic assessment.

READ MORE:

ocr.org.uk/qualifications/gcse/design-and-technology-j310-from-2017

KEY INFORMATION

SPECIFICATION CODE:

J310

IDEAL FOR:

Students who want to go on to AS or A Levels, higher education or a career choice

PROGRESS TO:

KS5 qualifications or apprenticeship schemes such as Cambridge Advanced Nationals, Cambridge Technicals, and A Level Design and Technology: Product Design, Design Engineering and Fashion and Textiles

FINAL AWARD:

9 (highest) to 1 (lowest)

PERFORMANCE POINTS:

Yes

Cambridge Nationals

ABOUT CAMBRIDGE NATIONALS

Offered at Level 1/Level 2 so you don't need to close off your students' options too early, Cambridge Nationals give you a real alternative. They're designed to fit into the curriculum and to offer the same size, rigour and performance points as GCSEs. They form a key part of a student's Progress 8 and Attainment 8 approved subjects under the Technical Award category. The qualifications are recognised by Ofqual, DfE and 16 to 19 providers as progression to A Level, further education or on to an apprenticeship or work.

CAMBRIDGE NATIONALS IN ENGINEERING

There are three separate GCSE-sized qualifications, in the areas of engineering design, manufacture and programmable systems to suit individual student needs.

Each qualification in the engineering suite has the same structure: one unit that's assessed through an exam and two further units that are centre-assessed. Your centre decides in which order you want to deliver the three units.

READ MORE:

ocr.org.uk/cambridgenationals

Cambridge National in Engineering Design

THE QUALIFICATION

Engineering design is a process used to identify market opportunities and solve problems that contribute to the development of new products and systems. This popular course is an opportunity for your students to study the processes involved in designing new engineered products and develop a design specification.

Our Cambridge National in Engineering Design will inspire and equip students with the confidence to use skills that are relevant to the sector and more widely. It covers the design process, types of drawings, influences on design, and the use of computer-aided design (CAD) in Engineering.

You can deliver this qualification on its own or as part of an engineering curriculum providing useful contextualisation alongside other Cambridge Nationals in Engineering and GCSE Design and Technology subjects.

ASSESSMENT

Level 1/Level 2 Cambridge National in Engineering Design consists of three units:

- R038: Principles of engineering design
- R039: Communicating designs
- R040: Design, evaluation and modelling

R038 is a written paper. The other units are NEA units. There are two submission windows for the NEA (January and June in the year of certification).

READ MORE:

ocr.org.uk/qualifications/cambridge-nationals/engineering-design-level-1-2-j822

KEY INFORMATION

SPECIFICATION CODE:

Level 1/Level 2 Cambridge National Certificate in Engineering Design (120 GLH) – J822

IDEAL FOR:

Students aged 14 to 16 who are seeking a more practical and hands on approach to learning

PROGRESS TO:

A Levels, apprenticeships or further advanced vocational qualifications at Level 3, such as our Cambridge Advanced Nationals or Cambridge Technicals

FINAL AWARD:

Level 1 – Distinction (D1), Merit (M1), Pass (P1)

Level 2 – Distinction* (*2), Distinction (D2), Merit (M2) and Pass (P2)

PERFORMANCE POINTS:

Included on the KS4 performance tables

Cambridge National in Engineering Manufacture

THE QUALIFICATION

Engineering manufacture is about different manufacturing practices and processes using machines, tools and equipment that turn raw materials into new products. This qualification enables your students to study these processes. It also allows them to operate the tools and equipment used to make products from the requirements of a design specification, as well as use relevant computer applications such as CAD/CAM, and CNC equipment.

You can deliver this qualification on its own or as part of an engineering curriculum providing useful contextualisation alongside other Cambridge Nationals in Engineering and GCSE Design and Technology subjects.

To offer this qualification, your centre will need access to engineering production equipment such as CAD and CNC.

ASSESSMENT

Level 1/Level 2 Cambridge National in Engineering Manufacture is made up of three units:

- R014: Principles of engineering manufacture
- R015: Manufacturing a one-off product
- R016: Manufacturing in quantity

R014 is a written paper. The other units are NEA units. There are two submission windows for the NEA (January and June in the year of certification).

READ MORE:

ocr.org.uk/qualifications/cambridge-nationals/engineering-manufacture-level-1-2-j823

KEY INFORMATION

SPECIFICATION CODE:

Level 1/Level 2 Cambridge National Certificate in Engineering Manufacture (120 GLH) – J823

IDEAL FOR:

Students aged 14 to 16 who are seeking a more practical and hands on approach to learning

PROGRESS TO:

A Levels, apprenticeships or further advanced vocational qualifications at Level 3, such as our Cambridge Advanced Nationals or Cambridge Technicals

FINAL AWARD:

Level 1 – Distinction (D1), Merit (M1), Pass (P1) and Unclassified

Level 2 – Distinction* (*2), Distinction (D2), Merit (M2) and Pass (P2)

PERFORMANCE POINTS:

Included on the KS4 performance tables for England

Cambridge National in Engineering Programmable Systems

THE QUALIFICATION

Our Cambridge National in Engineering Programmable Systems will help students to develop a deep understanding of the key principles that underpin how electronic and programmable technologies work.

They'll learn the fundamental principles and concepts of engineering programmable systems. They'll also take part in engaging practical tasks such as constructing and testing electronic circuits for a specific purpose, using tools and equipment to assemble printed circuit boards.

This qualification can be delivered on its own or as part of an engineering curriculum providing useful contextualisation alongside other Cambridge Nationals in Engineering and GCSE Design and Technology.

To offer this qualification, your centre needs access to equipment and resources to produce PCBs and programmable systems.

ASSESSMENT

Level 1/Level 2 Cambridge National in Engineering Programmable Systems consists of three units:

- R047: Principles of electronic and programmable systems
- R048: Making and testing electronic circuits
- R049: Developing programmable systems

R047 is a written paper that makes up 40% of the qualification. The other units are NEA units. There are two submission windows for the NEA (January and June in the year of certification).

KEY INFORMATION

SPECIFICATION CODE:

Level 1/Level 2 Cambridge National in Engineering Programmable Systems (120 GLH) – J824

IDEAL FOR:

Students aged 14 to 16 who are seeking a more practical and hands on approach to learning

PROGRESS TO:

A Levels, apprenticeships or further advanced vocational qualifications at Level 3, such as our Cambridge Advanced Nationals or Cambridge Technicals

FINAL AWARD:

Level 1 – Distinction (D1), Merit (M1), Pass (P1) and Unclassified

Level 2 – Distinction* (*2), Distinction (D2), Merit (M2) and Pass (P2)

PERFORMANCE POINTS:

Included on the KS4 performance tables for England

READ MORE:

ocr.org.uk/qualifications/cambridge-nationals/engineering-programmable-systems-level-1-2-j824

AS Level Design and Technology

THE QUALIFICATION

Design and Technology strengthens learners' critical thinking and problem solving skills within a creative environment, enabling them to develop and make prototypes/products that solve real-world problems, considering their own and others' needs, wants, aspirations and values. Our qualifications require learners to identify market needs and opportunities for new products, initiate and develop design solutions, and make and test prototypes/products. Students should acquire subject knowledge in design and technology, including how a product can be developed through the stages of prototyping, realisation and commercial manufacture.

In order to support the in-depth learning of different routes that students may progress to, three subject endorsements are available, linked to design disciplines that reflect possible higher education routes and industry:

- **Design Engineering**
- **Fashion and Textiles**
- **Product Design**

ASSESSMENT

There are two submission options for the non-exam assessment. These options determine the entries, but do not signify different routes through the qualification.

AS Level

Students must take either:

- Components 01 and 02 for the Cambridge OCR repository submission option

or

- Components 01 and 03 for the postal submission option

Principles of Design and Technology* (01) – written paper
50% of total AS Level

Product Development* (02, 03) – non-exam assessment
50% of total AS Level

*Indicates inclusion of synoptic assessment.

READ MORE:

ocr.org.uk/qualifications/as-and-a-level/design-and-technology-h004-h006-h404-h406-from-2017

KEY INFORMATION

SPECIFICATION CODE:
AS Level – H004, H005, H006

IDEAL FOR:
Students who want to go on to A Levels, higher education or a career choice

PROGRESS TO:
A Level, higher education, apprenticeships or a career in the engineering and manufacturing industries

FINAL AWARD:
A (highest) to E (lowest)

PERFORMANCE POINTS:
Yes

A Level Design and Technology

THE QUALIFICATION

Design and Technology strengthens learners' critical thinking and problem solving skills within a creative environment, enabling them to develop and make prototypes/products that solve real-world problems, considering their own and others' needs, wants, aspirations and values. Our qualifications require learners to identify market needs and opportunities for new products, initiate and develop design solutions, and make and test prototypes/products. Students should acquire subject knowledge in design and technology, including how a product can be developed through the stages of prototyping, realisation and commercial manufacture.

In order to support the in-depth learning of different routes that students may progress to, three subject endorsements are available, linked to design disciplines that reflect possible higher education routes and industry:

- **Design Engineering**
- **Fashion and Textiles**
- **Product Design**

ASSESSMENT

There are two submission options for the non-exam assessment. These options determine the entries, but do not signify different routes through the qualification.

A Level

Students must take either:

- Components 01, 02 and 03 for the Cambridge OCR repository submission option

or

- Components 01, 02 and 04 for the postal submission option

Principles of Design and Technology* (01) – written paper
26.7% of total A Level

Problem Solving* (02) – written paper
23.3% of total A Level

Interactive Design Project* (03, 04) – non-examined assessment
50% of total A Level

*Indicates inclusion of synoptic assessment.

READ MORE:

ocr.org.uk/qualifications/as-and-a-level/design-and-technology-h004-h006-h404-h406-from-2017

KEY INFORMATION

SPECIFICATION CODE:
A Level – H404, H405, H406

IDEAL FOR:
Students who want to go on to higher education or a career choice

PROGRESS TO:
Higher education, apprenticeships or a career in the engineering and manufacturing industries

FINAL GRADING:
A (highest) to E (lowest)

PERFORMANCE POINTS:
Yes

Cambridge Technicals in Engineering

CAMBRIDGE TECHNICALS

ABOUT CAMBRIDGE TECHNICALS

Cambridge Technicals are vocational qualifications at Level 2 and Level 3 for students **aged 16+**. They're designed with the workplace and progression to higher education in mind and provide a high-quality alternative to A Levels at Level 3. Qualifications at Levels 2 and 3 have a mixture of internal and external assessments and centres are allocated a visiting moderator.

Level 2

Our Level 2 Cambridge Technicals in Engineering qualifications aim to develop your students' understanding, skills and knowledge of the engineering industry. Your students will gain an insight into the engineering sector as they, where applicable, learn about a specific sector such as design engineering, production engineering or systems engineering. Designed in collaboration with industry experts, the qualifications focus on the requirements that today's employers demand.

Thanks to a broad range of centre-assessed units with practical and wider project based assessment opportunities, as well as examined units on the fundamentals of mechanical, electrical/electronic and fluid power engineering and the application of engineering principles, these are focussed qualifications. There are also job role-specific pathways for your students to choose from.

KEY INFORMATION

SPECIFICATION CODES:

Engineering Level 2 (2016) Certificate/Diploma – 05887, 05888

PERFORMANCE POINTS:

The 2016 suite is eligible for Key Stage 5 performance points

IDEAL FOR:

Students aged 16+

PROGRESS TO:

Level 3, apprenticeships, employment

Cambridge Technicals in Engineering

There are funding changes from July 2025 impacting these qualifications in England.
Please see our Level 3 qualification funding guide for England.

Level 3

Our Level 3 Cambridge Technicals in Engineering qualifications help your students to achieve their potential and progress to the next stage of their lives, whether that's higher education, an apprenticeship or employment.

We have designed refreshing and exciting content that's up to date, engaging, fit for purpose and suitable for the needs of your students. To do this, we've consulted with universities, employers and industry specialists to make sure your students will gain the right combination of knowledge, understanding and skills required for the 21st century.

An extensive range of centre-assessed units with practical and wider project based assessment opportunities, as well as examined units on the Principles of Mechanical Engineering and Principles of Electrical and Electronic Engineering, has resulted in focussed qualifications. Depending on the size chosen, these qualifications either complement a Key Stage 5 study programme alongside other vocational qualifications or A Levels, or may make up the bulk of a two-year study programme. Our diplomas have vocational pathways within them that students can follow (one pathway must be achieved).

READ MORE:

ocr.org.uk/cambridgetechnicals

KEY INFORMATION

SPECIFICATION CODES:

Engineering Level 3 (2016) Certificate (05822)/Extended Certificate (05823)/Foundation Diploma (05824)

Engineering Level 3 (2016) Diploma (05825)/ Extended Diploma (05873)

PERFORMANCE POINTS:

The Level 3 (2016) Certificate/Extended Certificate/ Foundation Diploma are eligible for Key Stage 5 performance points in England until 2026

The Level 3 (2016) Diploma and Extended Diploma are eligible for Key Stage 5 performance points in England until 2028

FUNDING:

Funding is not available in England for new cohorts starting in September 2025 for the Certificate, Extended Certificate and Foundation Diploma

Funding for the Diploma and Extended Diploma has been extended into 2026/27

IDEAL FOR:

Students aged 16+

PROGRESS TO:

Higher education, apprenticeships, employment

UCAS POINTS:

Level 3 qualifications receive UCAS tariff points

Cambridge Advanced Nationals

ABOUT CAMBRIDGE ADVANCED NATIONALS

Cambridge Advanced Nationals are our Level 3 Alternative Academic Qualifications, available for first teaching from 2025. All our Level 3 150 GLH, 180 GLH (AS Level size) and 360 GLH (A Level size) Cambridge Advanced Nationals submitted in Cycle 1 are approved for funding.

Designed for students aged 16–19 years, our Level 3 Cambridge Advanced Nationals will complement existing A Level and post-16 study programmes.

Our qualifications provide students with the practical and essential skills and knowledge they need to better prepare themselves for entry into higher education.

Level 3 Alternative Academic Qualification Cambridge Advanced National in Engineering

THE QUALIFICATION

Our Cambridge Advanced National in Engineering provides students with theoretical knowledge and hands-on experience of engineering, equipping them with the understanding and skills that will help prepare them for progression to undergraduate study and are relevant to the engineering sector.

There are 2 qualifications available in Engineering. These are:

- Cambridge Advanced National in Engineering (Certificate)
- Cambridge Advanced National in Engineering (Extended Certificate)

The Extended Certificate qualification is the same size as an A Level. Students should take this alongside A Levels as part of their programme of study at Key Stage 5 to help them build broader knowledge and skills that are valued in undergraduate study and are relevant for progression to higher education.

ASSESSMENT

Certificate

There are two mandatory units that students must complete:

- Principles of engineering (F130) – External assessment
- Materials science and technology (F131) – External assessment

Extended Certificate

There are three mandatory units, and two optional units students must complete:

- Principles of engineering (F130) – External assessment
- Materials science and technology (F131) – External assessment
- Engineering in practice (F132) – NEA

The two optional units are chosen from the following five units:

- Computer Aided Design (CAD) (F133) – NEA
- Programmable electronics (F134) – NEA
- Mechanical product design (F135) – NEA
- Computer Aided Manufacture (CAM) (F136) – NEA
- Electrical devices and circuits (F137) – NEA

KEY INFORMATION

SPECIFICATION CODES:

Cambridge Advanced National in Engineering Certificate/Extended Certificate – H027/H127

PERFORMANCE POINTS:

Both qualifications are eligible for Key Stage 5 performance points

FINAL AWARD:

Certificate: D* (highest) to P (lowest)

Extended Certificate: D* (highest) to P (lowest)

IDEAL FOR:

Students aged 16+

PROGRESS TO:

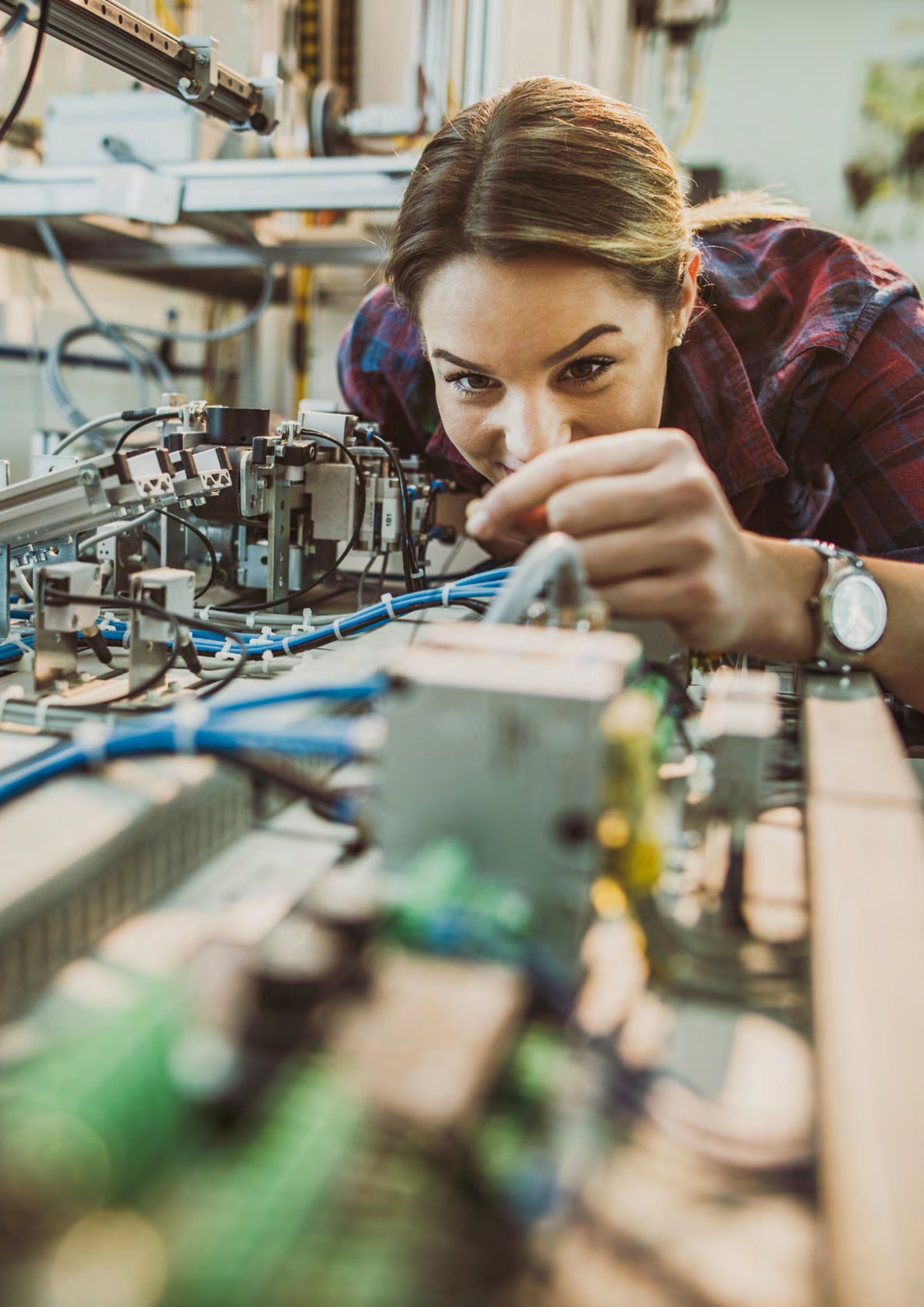
Higher education, apprenticeships, employment

UCAS POINTS:

Level 3 qualifications receive UCAS tariff points

READ MORE:

ocr.org.uk/qualifications/alternative-academic-qualifications/engineering-level-3-h027-h127



Supporting you in qualification delivery

Our aim is to support you on your journey with us from initial enquiry right through to results. To help you get going, support you through delivery and allow you to develop professionally, we provide a massive range of support to help secure your students' futures.

SUPPORT AND RESOURCES

EXPERT SUBJECT ADVICE

Our subject advisors provide information and support to schools, including specification and non-exam assessment advice, updates on resource developments and a range of training opportunities. You can reach them through our customer support centre on **01223 553998** or by email at **d&t@ocr.org.uk**

You can also find teacher support at **ocr.org.uk/engineering**, **ocr.org.uk/designandtechnology** or **@OCR_DesignTech**

TEACHING AND LEARNING RESOURCES

- **Teach Cambridge**
  Teach Cambridge is our personalised and secure website that provides teachers with a single point of access to all the support and resources you need to teach our qualifications.
- **Lesson elements**
  Task sheets and accompanying instructions for some of the activities in the delivery guide.
- **Skills guides**
  A range of generic skills guides providing knowledge and tips covering topics such as communication, research skills and exam techniques.
- **Topic exploration packs**
- **Teacher and delivery guides**
  A range of lesson ideas with associated activities that you can use with students to deliver the contents of the qualifications.
- **Transition guides**
- **Mapping guides**

SAMPLE LEARNER WORK

We've created sample learner work across the majority of our qualifications that will support you in understanding the expectations of the mark schemes.

PARTNER RESOURCES AND TEXTBOOKS

Our design and technology qualifications are supported by endorsed textbooks and resources published by leading publishers. You can find more details about our publisher partners and the resources they're providing at **ocr.org.uk/publishing-partners**

BLOGS

Read our blogs and gain interesting insights from our subject advisors and other leading figures from the world of education.

KEEP UP TO DATE

Sign up today at **ocr.org.uk/signup** for Cambridge OCR updates including subject news, upcoming events and useful resources.

ASSESSMENT

ACTIVE RESULTS

This is a **free** online A Level, GCSE and Cambridge Nationals results analysis service to help you review the performance of individual students or your whole school. Active Results provides access to detailed results data, enabling more comprehensive analysis of results to give you a more accurate measure of the achievements of your centre and students. Find out more at **ocr.org.uk/activeresults**

ASSESSMENT MATERIALS

Sample question papers and sample candidate work.

EXAMBUILDER

A **free** online mock assessment service for Cambridge Nationals Engineering. It draws on historical past papers to simulate a real examination and gives students the opportunity to practise and build up confidence. **ocr.org.uk/exambuilder**

PAST PAPERS

You and your students can practise with previous examination papers for each subject.

PRACTICE PAPERS

Create mock exams and help students get a clearer picture of the qualification requirements. We put all our practice papers through exactly the same long and detailed processes as the live papers to ensure that they match the style and rigour of the live assessments.

CANDIDATE EXEMPLARS

A selection of candidate answers and work with associated examiner commentary.

SET ASSIGNMENTS

Set assignments provide a scenario and set of tasks that can be modified, following the guidance provided, to enable you to assess your students against the requirements specified in the marking criteria in a flexible way that allows access to most centres, regardless of the resources they have at their disposal.

ACCESS TO SCRIPTS

A **free** service for exams officers to download copies of your students' completed question papers.

TRAINING AND PROFESSIONAL DEVELOPMENT

PROFESSIONAL DEVELOPMENT TRAINING AND EVENTS

All our qualifications are supported with comprehensive training. Check out **ocr.org.uk/professionaldevelopment** to find out what's available for face-to-face or online training courses.

Join our teacher panel

Share valuable feedback on everything from creative concepts to teaching and support resources.

ocr.org.uk/join

Next steps

Step 1

Already a Cambridge OCR centre? Great, you're all set.

If not, call our Customer Development Team on 02476 856072

Step 2

Ask your exams officer for access to **Teach Cambridge**

teachcambridge.org

Step 3

Download the specification and check out our range of resources

Step 4

Keep up-to-date by signing up for email updates

Step 5

Book onto professional development events and **teacher networks**

ocr.org.uk

For more information visit

ocr.org.uk/engineering
ocr.org.uk/designandtechnology
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